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tube; in fact, in some genera these hairs seem to serve rather as a guide to the pollen tube. The fusion of the polar nuclei is tardy. The antipodals are always more than 3 in number, and in some genera very many more. The most striking feature of the ovule is the "hypostase" of VAN TIEGHEM, which is a clearly differentiated group of cells beneath the embryo sac, whose thin walls give the lignin reaction to stains. It occurs sometimes immediately beneath the embryo sac and sometimes deep in the chalaza. Its function is doubtful. The author raises the question whether it is not a distinct disadvantage in shutting off water conduction to the embryo sac.

In connection with seed development the author followed the changes in the tissues of the 2 integuments, finding that the inner integument contributes chiefly to the testa, but its persistent innermost layer separates from the testa and becomes a thin pellicle completely covering the embryo. In some of the genera in connection with seed formation, tracheae are developed in the periphery of the nucellus, connecting with the strands of the raphe and traversing the whole length of the nucellus. The author suggests that this is comparable to the tracheal nucellar mantle which characterizes the seeds of some of the Cycadofilicales. This feature has not been discovered before in the seeds of living plants.—J. M. C.

Tree growth.—MACDOUGAL²⁵ has issued a preliminary report describing briefly an instrument for recording the variations in diameter of tree trunks. Records extending over several months have now been made of individual trees of *Fraxinus arizonica*, *Pinus chihuahuana*, *P. radiata*, *Quercus agrifolia*, *Fagus grandifolia*, and *Platanus occidentalis*.

SHREVE²⁶ has added to these data a preliminary report of determination made on some stumps of *Pinus radiata*. The maximum increase in diameter for 10 years was 14 inches, while growth in height of 10 ft. for trees 12-15 inches in diameter has been known.—GEO. D. FULLER.

A new atmometer.—BATES²⁷ has devised a new atmometer which is said to have very nearly the same relation to wind and radiant energy as do the leaves of trees. A flat metallic chamber is constructed with a layer of moist linen between the upper and lower plates. The upper plate not only protects from rain, but also, possessing a blackened surface, absorbs radiant energy freely, while the lower plate is perforated to resemble the stomatal surface of leaves. Experiments have shown that the evaporation from this instrument follows the transpiration from small coniferous trees very closely.—GEO. D. FULLER.

²⁵ MACDOUGAL, D. T., The dendrograph. Carn. Inst. Wash. Year Book for 1919. 18:72-78. 1920.

²⁶ SHREVE, FORREST, Stem analysis and elongation in shoots of Monterey pine. Carn. Inst. Wash. Year Book for 1919. 18:88-89. 1920.

²⁷ BATES, C. G., A new evaporimeter for use in forest studies. Mo. Weather Rev. 47:283-294. figs. 3. 1919.